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AN ECONOMIC ASSESSMENT OF INSHORE AND NEARSHORE GROUNDFISH ENTERPRISES IN NAFO DIVISIONS 3K, 3L AND 3Ps 1981-83

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September, 1985

Canada

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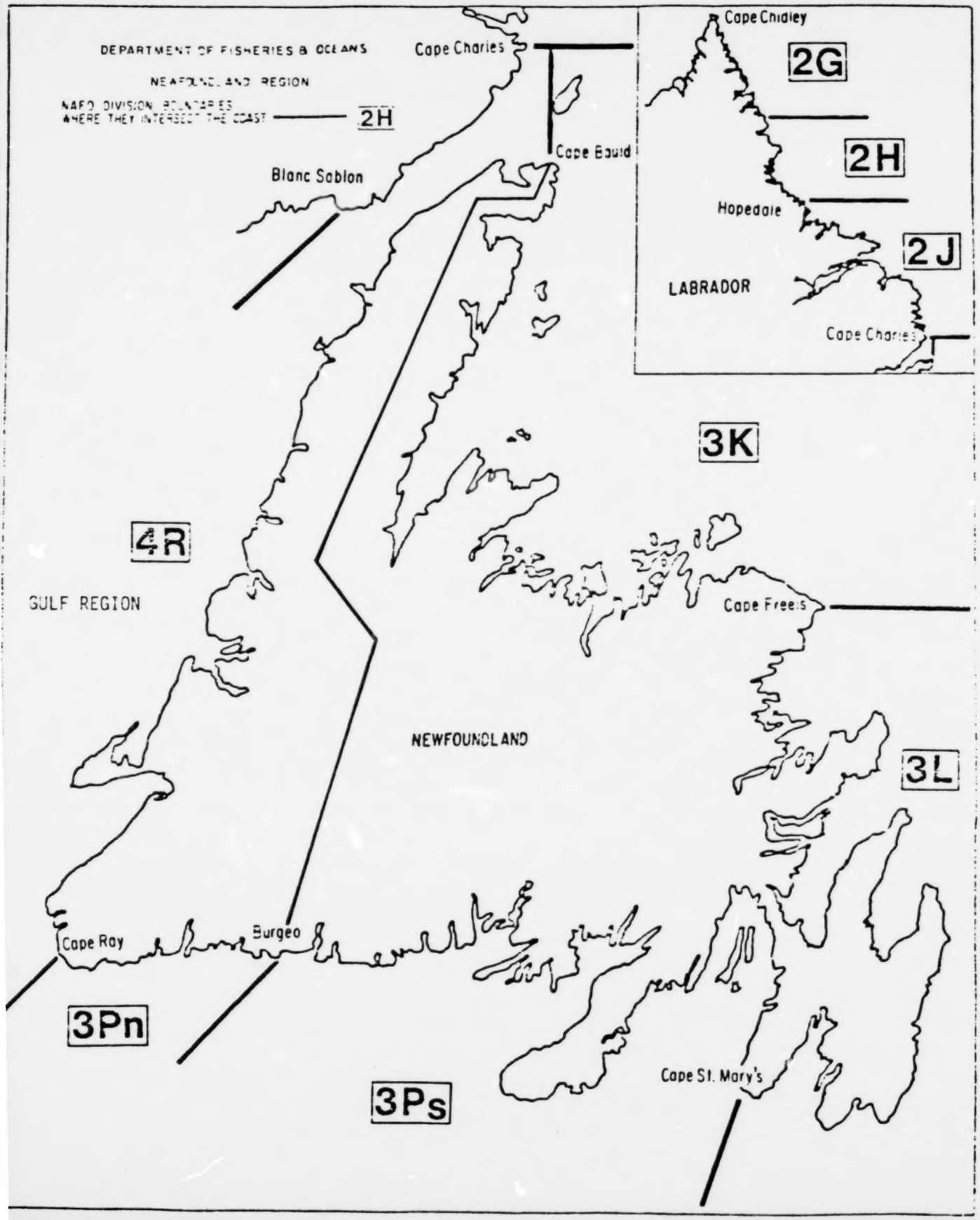
FIGURE 1: LAND BOUNDARIES OF NAFO DIVISIONS IN THE NEWFOUNDLAND REGION



SECTION 1: INTRODUCTION

The purpose of this study is to provide an economic assessment of full-time fishing enterprises less than 65 feet length overall (LOA) engaged in the groundfish fishery in NAFO Divisions 3K, 3L and 3Ps of the Newfoundland Region (Figure 1) during the 1981-83 period. These enterprises use fixed groundfish gears predominately and do not participate in the purse seine, otter trawl or crab fisheries. The objectives of the assessment are:

1. to evaluate the economic viability of the average enterprise in each groundfish fleet sector;
2. to estimate the percentage of the total enterprises in each fleet sector that achieved economic viability;
3. to determine the percentage of the total catch of each fleet sector accounted for by the percentage of enterprises that were economically viable; and
4. to determine the resource required by each fleet sector to attain economic viability.

For the purposes of this study, a fishing enterprise refers to all vessels, gear, facilities and equipment owned and used by an individual, partnership, or incorporated company and any vessels, gear, facilities and equipment owned by a crewmember and used by the enterprise in the fishery. Three categories of enterprises have been identified for this study. These include enterprises 20-34 feet, enterprises 35-44 feet and enterprises 45-64 feet, and, are categorized based on the length overall of

the primary (most important) fishing vessel as designated by the skipper. Each category identified is sufficiently distinct from the others with respect to structural features, investment levels and operational characteristics as to warrant separate treatment in this study.

These three categories do not represent all enterprises less than 65 feet in the Newfoundland fishery. The first category identifies enterprises belonging to the inshore fishery but does not include enterprises with primary vessels less than 20 feet LOA. The remaining categories contain vessels belonging to the nearshore fishery but do not represent nearshore enterprises in the purse seine, otter trawl, or crab fisheries. Finally, enterprises in NAFO Subarea 2, as well as enterprises skippered by part-time fishermen are not included.[1] These groups have been excluded either because they have been assessed elsewhere or because sufficient data were unavailable to complete a proper assessment.

Data for this study have been obtained from a number of costs and earnings reports published by the Economics Branch[2] and from the Statistics and Systems Branch of the Department of

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[1]Nearshore enterprises skippered by part-time fishermen that met a minimum landed value requirement are included in the analysis. See Appendix 2 for elaboration.

[2]See the publications listing at the end of this report for further details.

Fisheries and Oceans, Newfoundland Region. The report is divided into six sections. Section 2 provides a description and explanation of the methodology. Section 3 contains the economic assessment of inshore groundfish enterprises 20-34 feet in NAFO Divisions 3K, 3L and 3Ps for the 1981-83 period. Sections 4 and 5 present similar assessments for nearshore groundfish enterprises 35-44 feet and 45-64 feet, respectively. The major conclusions and recommendations of the tudy are outlined in Section 6.

SECTION 2: METHODOLOGY

The major analytical tool used in this study is break-even analysis which is a standard method for evaluating the economic performance of a fishing enterprise or any other unit of production. In simplest terms, it calculates all the costs - including labour and a reasonable return on capital invested (opportunity cost of capital) - that are incurred by an enterprise during the fishing season and determines the level of landings required to meet them. Enterprises that surpass their break-even landings levels earn economic profit, whereas those that land less experience economic losses.

An important feature of the break-even methodology is that it permits an analysis of enterprise viability subject to the need for the enterprise to generate specified income levels. Three different labour cost options have been used. Option "A" uses the opportunity cost of labour (which is assumed to be the annual Industrial Aggregate Wage for Newfoundland) as the labour cost.[1] Under this option, the opportunity wage is prorated for the time the enterprise actually fished during the season. It is considered part of the fixed costs and is calculated for each deckhand and the skipper. Each skipper is allocated a premium of 20% based upon the premise that he has entrepreneurial skills

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[1]Statistics Canada reports annual industrial aggregate wages for Newfoundland of $17,056, $18,824 and $18,876 respectively for 1981, 1982 and 1983.

which should be compensated. Option "B" uses an identical approach except that it assumes a full annual income should be generated from fishing activity. Option "C" uses the existing share arrangements in the fishery to determine labour costs. In this instance, incomes are determined by the level of actual catches and are not included as part of fixed costs. The formula used to determine the required landings for an enterprise to break even under Options "A" and "B" is:

$$FC + AVC(X) = AR(X)$$

where: FC = Fixed Costs;

AVC = Average Variable Costs Per Kilogram Landed;

AR = Average Revenue per Kilogram Landed; and

X = Landings Required to Break Even.

The formula used to determine the required landings for an enterprise to break even under Option "C" is:

$$FC + AVC(X) + ALC(X) = AR(X)$$

where the previous definitions hold and:

ALC = Average Labour Cost Per Kilogram Landed.

Fixed costs include fixed expenses such as licence fees, repair and maintenance expenses, the opportunity cost of capital, and depreciation. Repair and maintenance expenses are included as fixed costs because the bulk of such expenditures occur at the start of the season, are non-recurring and do not increase

proportionately with the level of effort. The opportunity cost of capital is the rate of return that could have been earned if the capital invested in vessels and facilities and equipment had been employed in its next best alternative in the economy. For the purpose of this study, it is set at 10% which is estimated to be the long-term rate of return on government securities. Depreciation is calculated for vessels and facilities and equipment using the straight-line method. Wooden vessels under 35 feet are depreciated over 10 years, while wooden vessels 35-64 feet are depreciated over 15 years. Fiberglass and steel vessels are depreciated over 15 and 20 years, respectively, while facilities and equipment are depreciated over 20 years.

In previous studies[1] of this nature, gear was treated as a capital item and was depreciated over a five-year period. This procedure has since been found to be unsuitable because the useful or working life of different types of gear vary significantly (e.g. grapnels compared to fish hooks) and it is difficult to develop a properly weighted lifespan for fishing gear in general. In addition, in obtaining data respecting gear investment, most fishermen provided estimates of their existing gear stock regardless of when individual items had been purchased. Often obsolete

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[1]See, for instance:
Brocklehurst, G.P., An Economic Assessment of the Newfoundland Inshore Mobile Groundfish Fishery, 1979. Economic Services Branch, Department of Fisheries and Oceans, Newfoundland Region, January, 1981.

gear well beyond its useful life was included with he inventory simply because it had been retained in storage. This tended to inflate the investment in gear. All fishing gear is therefore expensed in this study rather than depreciated with the full value of gear purchased during the study year treated as an expense for that year. Since averages for the fleet as a whole are used, any major gear purchases by a small percentage of the enterprises does not distort the data. Gear purchases are added into the equation as part of fixed costs since, like repair and maintenance expenses, the bulk of these expenditures occur at the beginning of the season, and are essentially non-recurring.

Variable costs include daily operating costs which increase proportionately with the level of effort. Fuel, oil, bait, ice and salt form the bulk of these expenses.

In the break-even analyses presented in this report, allowance has been made for the presence or absence of government subsidies and bounties. The presence (absence) of these subsidies reduces (increases) the opportunity cost of capital which, in turn, reduces (increases) the landings required by the enterprise to break even. Under the Net Cost Basis, the break-even calculations are based on the entrepreneur's investment in the fishery, i.e. subsidies are not included in the cost profile. Under the Full Cost Basis, subsidies are included and the break-even calculations reflect the total investment in the fishery. The former provides an analysis of the fishery under the

assumption that subsidies will continue whereas the latter analyzes the fishery from the perspective that the various fleet sectors should generate sufficient revenues to allow for the discontinuation of government subsidies in the future.

Sections 3-5 present economic assessments of the identified fleet sectors by NAFO Division for the 1981-83 period. These assessments are undertaken using Labour Option "C", Net Cost Basis, i.e. the existing share arrangements in the fishery and the entrepreneur's investment only. Although Labour Option "C", Full Cost Basis is generally held to be the most acceptable strategy for managing the groundfish fishery in the Newfoundland Region, we have chosen the Net Cost Basis because: (a) it most accurately reflects conditions being faced by fishermen; and (b) subsidies in the fleets under study are not significant and therefore the break-even requirements do not vary appreciably whether the Net Cost or Full Cost Basis is used. For the more rigorous-minded analyst, however, Appendix 1 contains the economic assessments utilizing the remaining cost options. Where appropriate, the implications of incorporating these options for managing the fishery are highlighted in the sections that follow.

The next three sections each contain four subsections. The first subsection provides an analysis of the economic performance of the average sampled enterprise. The second identifies the increases in catch required for the fleet as a whole to attain economic viability. It is assumed that any increase in catch

will be composed entirely of groundfish since this is the predominant "growth" fishery in the Newfoundland Region. The third subsection identifies the landings actually recorded by each fleet sector and determines the number(s) of enterprises that could be supported at the break-even level by these landings. The fourth subsection analyzes the distribution of enterprises by level of landed revenue to determine the proportion of each fleet that achieved the required average break-even revenue level.

SECTION 3: INSHORE ENTERPRISES 20-34 FEET

3.1 Economic Performance - Average Sampled Enterprise

The actual performance and the required break-even economic performance for the average sampled inshore enterprise is outlined (Table 1, p. 11) for the period 1981-83. Analysis indicates that the average enterprise, in each NAFO Division, would require a substantial increase in groundfish landings over the entire period in order to break even under Labour Cost Option "C", net cost basis. Over the three-year period, the smallest increase in groundfish landings would be required by the average enterprise in NAFO Division 3L (from 35,614 kg. to 49,718 kg. in 1982) while the largest increase would be required by the average enterprise in NAFO Division 3Ps (from 18,747 kg. to 87,824 kg. in 1983).

Table 1 also shows that the average enterprise in NAFO Division 3L generally came closer to achieving the required break-even revenue level than the average enterprise in NAFO Divisions 3K or 3Ps. Average annual revenue, over the three-year period, would be required to increase from $13,682 to $20,947 (approximately 53%) for the average 3L enterprise compared with a required increase from $11,349 to $21,665 (approximately 91%) for the average 3K enterprise and from $10,697 to $30,661 (approximately 186%) for the average 3Ps enterprise.

The average enterprise in NAFO Division 3Ps requires an extremely large increase in landings and revenue in order to

TABLE 1

ACTUAL PERFORMANCE AND THE REQUIRED BREAK-EVEN ECONOMIC PERFORMANCE FOR THE AVERAGE SAMPLED INSHORE ENTERPRISE, 20-34 FEET, BY NAFO DIVISION, 1981-83

	DIVISION 3K			DIVISION 3L			DIVISION 3Ps		
	1981	1982	1983	1981	1982	1983	1981	1982	1983
ACTUAL PERFORMANCE:									
Landings (kg):									
Groundfish	16,537	30,894	22,613	25,760	35,614	35,899	26,784	17,602	18,747
Pelagics & Estuarial	1,811	271	3,269	4,692	5,447	2,720	2,475	267	114
Molluscs & Crustaceans	1,635	3,112	312	3,953	1,705	149	919	338	557
Total	19,983	34,277	26,194	34,405	42,766	38,768	30,178	18,207	19,418
Revenue ($)	9,030	13,382	11,635	12,120	14,927	13,999	12,802	8,812	10,477
Return on Investment ($)	-	-	-	-	166	-	-	-	-
Average Income ($):									
Skipper	2,987	3,966	4,115	3,945	4,391	4,422	4,817	3,696	5,614
Deckhand	2,906	4,211	3,953	4,103	5,299	4,561	5,981	3,810	4,778
REQUIRED BREAK-EVEN ECONOMIC PERFORMANCE:									
Landings (kg):									
Groundfish	39,193	61,446	56,347	50,743	49,718	60,147	61,131	73,531	87,824
Pelagics & Estuarial	1,811	271	3,269	4,692	5,447	2,720	2,475	267	114
Molluscs & Crustaceans	1,635	3,112	312	3,953	1,705	149	919	338	557
Total	42,639	64,829	59,928	59,388	56,870	63,016	64,525	74,136	88,495
Revenue ($)	17,072	23,294	24,629	20,993	19,682	22,166	25,645	29,553	36,785
Return on Investment ($)	717	1,081	1,100	1,066	1,046	1,028	916	862	940
Average Income ($):									
Skipper	5,628	6,929	8,709	6,858	5,809	7,000	9,677	12,395	19,687
Deckhand	5,477	7,347	8,376	7,097	6,993	7,246	11,976	12,762	16,758
BREAK-EVEN GROUNDFISH LANDINGS AS A PERCENTAGE OF ACTUAL GROUNDFISH LANDINGS	237.0	198.9	249.2	197.0	139.6	167.5	228.2	417.7	468.5

break even primarily because of the large shares which are allocated to the skipper and deckhands. Depending upon the year, the average deckhand in 3Ps, for example, received between 43% and 47% of total revenue whereas the average deckhand in 3K and 3L received between 32% and 36% of revenue. Table 1 shows that the large share arrangements allocated to labour in Division 3Ps generate, at the break-even level, excessive incomes compared to Divisions 3K and 3L. Share arrangements in 3Ps would need to decline if comparatively excessive returns to labour are to be avoided under break-even conditions.

It is also interesting to note that increases in unit labour costs for the average 3Ps enterprise over the study period caused the required break-even revenue to increase substantially. Average labour costs increased from 42¢/kg. in 1981 to 54¢/kg. in 1983 as a result of increases in unit revenues. The increase in unit revenues was primarily due to changes in the species mix of the average sampled enterprise.

Tables 10-12 (Appendix 1, pp. 45-47) illustrate the break-even incomes and landings for all labour cost options compared to actual incomes and landings for inshore enterprises 20-34 feet in each NAFO Division for the study period. Required break-even landings and incomes are usually higher for Labour Cost Options "A" and "B" than for Option "C" for enterprises in NAFO Divisions 3K and 3L. Typically, required landings and incomes are slightly higher for Option "A" compared to Option "C". The existing share arrangements (Option "C") would pay

slightly less at the break-even level than the industrial aggregate wage prorated for the time spent fishing and less than half of the annual industrial wage. In NAFO Division 3Ps, however, the break-even wage under Option "C" compares favourably to the annual industrial wage (Option "B") and is considerably higher than the industrial wage prorated for the time actually spent fishing. As the following section shows, this has serious implications for the resource requirements of the inshore fleet in NAFO Division 3Ps.

3.2 Fleet Resource Requirements

Table 2 (p. 14) outlines the estimated population of active inshore enterprises, 20-34 feet, and the resource requirements for this fleet of enterprises to break even under Labour Option "C" (net cost) over the 1981-83 period.[1] It is interesting to note that the estimated population declined in each NAFO Division between 1981 and 1983. The decline was greatest for the 3Ps fleet which dropped from 654 enterprises in 1981 to 493 enterprises in 1983, a decrease of approximately 25%. The 3K fleet declined by 18% during the period (from 866 to 714 active enterprises) while in Division 3L the fleet declined by 19% (from 968 to 782 active enterprises).

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[1]The process used to estimate the population of active fishing enterprises in the Newfoundland Region is explained in Appendix 2 (pp. 54-60).

TABLE 2

FLEET RESOURCE REQUIREMENTS AND LANDINGS FOR INSHORE ENTERPRISES, 20-34 FEET, BY NAFO DIVISION, 1981-83

	DIVISION 3K			DIVISION 3L			DIVISION 3Ps		
	1981	1982	1983	1981	1982	1983	1981	1982	1983
NUMBER OF ENTERPRISES:	866	808	714	968	917	782	654	584	493
RESOURCE REQUIREMENTS (t):									
Groundfish	33,941	49,648	40,232	49,119	45,591	47,035	39,980	42,942	43,297
Pelagics & Estuarial	1,568	219	2,334	4,542	4,995	2,127	1,619	156	56
Molluscs & Crustaceans	1,416	2,515	223	3,827	1,563	117	601	197	275
Total	36,925	52,382	42,789	57,488	52,149	49,279	42,200	43,295	43,628
PERCENTAGE OF AVAILABLE GROUNDFISH ALLOWANCE REQUIRED TO SUPPORT FLEET AT BREAK-EVEN LEVEL:	21.5	32.0	26.3	31.1	29.4	30.7	174.6	178.3	179.8
ACTUAL LANDINGS (t):									
Groundfish	17,973	31,738	30,029	31,629	41,774	40,410	16,870	15,254	15,597
Pelagics & Estuarial	4,696	3,043	2,317	8,546	6,281	7,609	1,292	567	259
Molluscs & Crustaceans	4,883	7,158	592	8,774	3,315	253	2,130	629	778
Total	27,552	41,939	32,938	48,949	51,370	48,272	20,292	16,450	16,634
NUMBER OF ENTERPRISES CAPABLE OF BEING SUPPORTED AT BREAK-EVEN LEVEL BY ACTUAL GROUNDFISH LANDINGS	459	517	533	623	840	672	276	207	178
PERCENTAGE OF FLEET CAPABLE OF BEING SUPPORTED AT BREAK-EVEN LEVEL BY ACTUAL GROUNDFISH LANDINGS	53.0	64.0	74.6	64.4	91.6	85.9	42.2	35.4	36.1

In total, the inshore populations in NAFO Divisions 3K and 3L would require approximately 53% of the available 2J3KL groundfish allowance in 1981, 62% in 1982 and 57% in 1983 to break even.[1] The inshore fleet in NAFO Division 3Ps, however, would require between 175% and 180% of the available 3Ps groundfish allowance to break even in any given year during this period[2]. The data show that, even though the available groundfish allowances have remained stable and the number of enterprises has steadily declined, the percentage of the available groundfish required to support the fleets at the break-even level has not been reduced and, in some instances, has increased. This suggests that fleet reduction in and of itself does not necessarily result in improved fleet viability.

The high break-even wage levels and substantial resource requirements of the inshore fleet in NAFO Division 3Ps suggest that Labour Cost Option "C" may be an inappropriate strategy for managing this fishery. A more acceptable strategy for determining resource requirements for this fleet may be to

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1 Groundfish allowances for vessels less than 65 feet are established for the 2J3KL stock complex as a whole, i.e. quotas and allowances are not established separately for NAFO Divisions 2J, 3K and 3L, nor are they established separately for inshore and nearshore vessels. The groundfish allowance was 157,700 t, 155,000 t, and 153,100 t, in 1981, 1982 and 1983, respectively.

2 Groundfish allowances are set separately for NAFO Division 3Ps, but are not established separately for inshore and nearshore vessels. The total allowable groundfish catch was set at 22,900 t, 24,080 t, and 24,080 t in 1981, 1982, and 1983, respectively.

utilize a labour cost that is on par with break-even wages under Labour Cost Option "C" in Divisions 3K and 3L. Under this option, groundfish requirements and break-even wages would both decline and become more comparable to those in NAFO Divisions 3K and 3L.

3.3 Fleet Landings

Actual groundfish landings by the inshore fleets within each NAFO Division over the 1981-83 period were below the level required to support the entire fleet of active enterprises at the break-even level. Table 2, however, indicates that the inshore fleet in NAFO Division 3L came closer to landing the required amount of groundfish than enterprises in NAFO Divisions 3K or 3Ps. Over the three-year period, the 3L fleet landed an average of 80% of the average break-even groundfish requirements compared to 64% and 38%, respectively, for the fleets in Divisions 3K and 3Ps.

The data show that reductions in the fleets have not brought about an overall improvement in fleet viability. Only in Division 3K has a reduction in fleet size been accompanied by a continuous increase in the percentage of the fleet capable of being supported at the break-even level by actual landings. In Division 3Ps, the opposite is apparent and, although the fleet diminished by 25% from 1981-83, the percentage of the fleet that could be supported at the break-even level by actual landings fell by 6.1%. In Division 3L, fleet reduction was accompanied by a marked improvement in fleet viability in 1982, but met with a decrease in viability in 1983.

Table 2 also indicates that the actual catch of non-groundfish species was above the level required to support the fleet at the break-even level. This indicates that non-groundfish landings for the average sampled enterprise are less than non-groundfish landings of the average enterprise in the fleet. A probable cause for this discrepancy is the exclusion of enterprises less than 20 feet and part-time enterprises from the survey sample.

3.4 Proportion of the Fleet Achieving Average Break-Even Revenues

The previous subsections have shown that between 1981 and 1983, the economic performance of the average sampled inshore enterprise in NAFO Divisions 3K, 3L and 3Ps was substantially below the required break-even economic performance. It was also shown that actual groundfish landings within each NAFO Division were well below the level required to support each population on an economic basis. A certain percentage of the active inshore fleet within each NAFO Division, however, did operate as a group at the average required break-even revenue level.[1] Table 3 (p. 18)

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[1]The proportion of the fleet which achieved the average break-even revenue has been estimated based on individual sampled enterprise landed revenue data. To obtain these estimates enterprises were ranked in descending order of landed revenue and the percentage of enterprises which, as a group, achieved the average break-even revenue level was determined. This percentage was then applied to the number of active enterprises within each division to obtain an estimate of the proportion of the fleet which achieved the average break-even revenue. It should be noted that all enterprises within the break-even segment of each fleet did not earn the required break-even

(cont'd on page 19)

TABLE 3

PERCENTAGE OF ACTIVE INSHORE POPULATION, 20-34 FEET, OPERATING, AS A GROUP, AT THE AVERAGE BREAK-EVEN REVENUE LEVEL BY NAFO DIVISION, 1981-83

	DIVISION 3K			DIVISION 3L			DIVISION 3Ps		
	1981	1982	1983	1981	1982	1983	1981	1982	1983
PERCENTAGE OF FLEET OPERATING, AS A GROUP, AT THE AVERAGE BREAK-EVEN REVENUE LEVEL	28.6	30.6	18.8	42.9	70.4	49.3	37.1	9.7	2.3
NUMBER OF ENTERPRISES OPERATING, AS A GROUP, AT THE AVERAGE BREAK-EVEN REVENUE LEVEL	248	247	134	415	646	386	243	57	11
PERCENTAGE OF FLEET REVENUE EARNED BY BREAK-EVEN SEGMENT OF FLEET	54.9	56.9	39.3	73.1	93.1	77.8	75.0	31.0	8.3

provides estimates of the number of enterprises in each group operating at this level from 1981 to 1983.

Table 3 shows that the estimated break-even fleet segment within each NAFO Division was highly variable between 1981 and 1983. An average of approximately 54% of the 3L fleet, however, was operating at the required break-even revenue level, over the three-year period, compared with 26% of the 3K inshore fleet and only 18% of the 3Ps fleet. The data also indicate that the observed reductions in fleet sizes have not resulted in corresponding improvements in economic viability, i.e. the break-even fleet segments have not increased over the 1981-83 period.

Table 3 does show that the viable segment of the fleet earned a disproportionate amount of total fleet revenue. For example, the 248 viable enterprises (approximately 29% of the fleet) in Division 3K in 1981 earned 55% of total fleet revenue. Similarly, the 386 enterprises (approximately 50% of the fleet) operating at the break-even revenue level in Division 3L in 1983 earned approximately 78% of total fleet revenue.

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revenue. Many enterprises surpassed the break-even level while others experienced a shortfall. Collectively, however, the break-even or viable segment of each fleet did achieve the required average break-even revenue. It should also be noted that break-even revenues have been used instead of landings because the required break-even landings are formulated based upon one average price for fish. Not all enterprises had the same species mix and hence did not receive the same average price; distortions would thus arise if average landings were used.

SECTION 4: NEARSHORE ENTERPRISES - 35-44 FEET

4.1 Economic Performance - Average Sampled Enterprise

The actual performance and the required break-even economic performance for the average sampled nearshore enterprise, 35-44 feet, is outlined in Table 4 (p. 21) for the 1981-83 period. Analysis indicates that the average sampled enterprise, within each NAFO Division, would require a substantial increase in landings and revenue in order to reach the break-even level under Labour Cost Option "C", net cost basis. During the three-year period, for example, total landings would be required to rise from an average of 64,822 kg. to 159,275 kg. (an increase of approximately 146%) for the average 3K enterprise; from 85,791 kg. to 155,598 kg. (an increase of approximately 81%) for the average 3L enterprise; and, from 73,266 kg. to 221,395 kg. (an increase of approximately 202%) for the average 3Ps enterprise.

Table 4 also indicates that at the break-even level non-groundfish landings will be insignificant for the average enterprise in NAFO Divisions 3K and 3Ps. Non-groundfish landings account for 4% - 8% of total landings for the average 3K enterprise and 1% - 4% of total landings for the average 3Ps enterprise.

Non-groundfish landings are of considerable importance to the average enterprise in NAFO Division 3L. Non-groundfish catches (mainly capelin) account for 32% of total break-even landings in 1981, and 21% in both 1982 and 1983.

TABLE 4

ACTUAL PERFORMANCE AND THE REQUIRED BREAK-EVEN ECONOMIC PERFORMANCE FOR THE AVERAGE SAMPLED NEARSHORE ENTERPRISE, 35-44 FEET, BY NAFO DIVISION, 1981-83.

	DIVISION 3K			DIVISION 3L			DIVISION 3Ps[1]		
	1981	1982	1983	1981	1982	1983	1981	1982	1983
ACTUAL PERFORMANCE:									
Landings (kg):									
Groundfish	51,124	54,908	61,409	32,723	38,588	73,155	54,022	71,657	80,165
Pelagics & Estuarial	9,170	4,711	5,161	38,315	31,202	31,012	1,840	6,861	508
Molluscs & Crustaceans	1,574	6,276	133	16,222	550	50	3,703	629	414
Total	61,868	65,895	66,703	87,260	70,340	104,217	59,565	79,147	81,087
Revenue ($)	18,441	24,291	24,762	18,575	19,071	30,008	25,345	31,408	34,411
Return on Investment ($)	-	-	-	-	-	550	-	-	-
Average Income ($):									
Skipper	4,087	4,826	5,907	4,536	4,608	6,025	8,454	10,713	11,715
Deckhand	6,576	4,901	5,095	4,478	3,916	5,650	8,891	9,414	10,205
REQUIRED BREAK-EVEN ECONOMIC PERFORMANCE:									
Landings (kg):									
Groundfish	130,386	189,684	130,729	114,719	120,524	114,199	241,239	208,359	200,631
Pelagics & Estuarial	9,170	4,711	5,161	38,315	31,202	31,012	1,840	6,861	508
Molluscs & Crustaceans	1,574	6,276	133	16,222	550	50	3,703	629	414
Total	141,130	200,671	136,023	169,256	152,276	145,261	246,782	215,849	201,553
Revenue ($)	42,081	72,945	49,153	45,374	46,270	43,897	95,168	83,609	79,479
Return on Investment ($)	2,284	3,178	3,117	2,794	3,284	3,633	2,781	3,147	2,533
Average Income ($):									
Skipper	9,227	14,470	11,728	11,077	11,952	8,841	31,723	28,503	26,993
Deckhand	14,819	14,668	10,015	10,864	10,073	8,231	33,287	25,125	23,619
BREAK-EVEN GROUNDFISH LANDINGS AS A PERCENTAGE OF ACTUAL GROUNDFISH LANDINGS	255.0	345.5	212.9	350.6	312.3	156.1	446.6	290.8	250.3

[1]For NAFO Division 3Ps data is only available for enterprises 35-64 feet in 1981 and 1982. The assessment for these two years in Division 3Ps is therefore an analysis of all groundfish enterprises greater than 35 feet.

Analysis also indicates that the average enterprise in NAFO Division 3Ps would generally require a much larger increase in groundfish landings than the average enterprise in NAFO Divisions 3K or 3L in order to break even. As a three-year average, groundfish landings would be required to increase by approximately 216% for the average 3Ps enterprise compared to approximately 169% and 142% for the average 3K and 3L enterprise, respectively.

The large increase in landings required by the average 3Ps enterprise is due primarily to the sharing arrangement on these operations. Skippers in NAFO Division 3Ps, for example, received between 34% - 55% of total revenue during the period compared with 19% - 24% for skippers in NAFO Divisions 3K and 3L.

As a result of the larger share of the gross stock received by labour in Division 3Ps, labour incomes at the break-even level are more than double the income levels of the average 3K or 3L enterprise. Data in Appendix 1 (Tables 13-15, pp. 48-50) also illustrate that wages under Labour Cost Option "C" in NAFO Division 3Ps are considerably higher than the annual industrial aggregate wage, but in NAFO Divisions 3L and 3K are only 50% and 75% of the annual industrial wage, respectively. As the next section shows, the comparatively disproportionate sharing arrangement in Division 3Ps has serious implications for the groundfish requirements of the nearshore fleet and questions the suitability of setting resource requirements for this fleet under Labour Cost Option "C".

4.2 Fleet Resource Requirements

The number of active nearshore enterprises, 35-44 feet, within each NAFO Division declined during the 1981-83 period.[1] Table 5 (p. 24) shows that the largest decline (approximately 25%) occurred for the 3L fleet which decreased from 191 active enterprises in 1981 to 144 active enterprises in 1983. The active nearshore fleet in NAFO Division 3K dropped from 139 enterprises in 1981 to 125 enterprises in 1983, whereas the active 3Ps fleet, 35-44 feet, decreased from 125 to 118 enterprises. Table 5 also summarizes the resource required to support the active population at the break-even level under Labour Cost Option "C", net cost basis. With the exception of the nearshore fleet in NAFO Division 3K in 1982, total resource requirements have also been declining during the period. Enterprises in NAFO Division 3L, for example, required 32,328 tonnes of fish in 1981 but only 26,192 tonnes in 1982 and 20,918 tonnes in 1983. It would appear that, unlike the inshore fleets, decreases in the nearshore fleets, 35-44 feet, have been accompanied by overall reductions in break-even fleet resource requirements.

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[1] The process used to estimate the population of active fishing enterprises in the Newfoundland Region is explained in Appendix 2 (pp. 54-60).

TABLE 5

FLEET RESOURCE REQUIREMENTS AND LANDINGS FOR NEARSHORE ENTERPRISES, 35-44 FEET, BY NAFO DIVISION, 1981-83

	DIVISION 3K			DIVISION 3L			DIVISION 3Ps[1]		
	1981	1982	1983	1981	1982	1983	1981	1982	1983
NUMBER OF ENTERPRISES:	139	135	125	191	172	144	148	132	118
RESOURCE REQUIREMENTS (t):									
Groundfish	18,124	25,607	16,341	21,912	20,730	16,445	35,703	27,503	23,674
Pelagics & Estuarial	1,275	636	645	7,318	5,367	4,466	272	906	60
Molluscs & Crustaceans	219	847	17	3,098	95	7	548	83	48
Total	19,618	27,090	17,003	32,328	26,192	20,918	36,523	28,492	23,782
PERCENTAGE OF AVAILABLE GROUNDFISH ALLOWANCE REQUIRED TO SUPPORT FLEET AT BREAK-EVEN LEVEL:	11.5	16.5	10.7	13.9	13.4	10.7	155.9	114.2	98.3
ACTUAL LANDINGS (t):									
Groundfish	5,781	7,327	7,034	9,599	10,010	9,616	10,332	8,159	7,882
Pelagics & Estuarial	543	705	597	3,838	2,439	2,304	354	136	47
Molluscs and Crustaceans	193	442	-	1,068	89	-	115	2	10
Total	6,517	8,474	7,631	14,505	12,538	11,920	10,801	8,297	7,939
NUMBER OF ENTERPRISES CAPABLE OF BEING SUPPORTED AT BREAK-EVEN LEVEL BY ACTUAL GROUNDFISH CATCH	44	39	54	84	83	84	43	39	39
PERCENTAGE OF FLEET CAPABLE OF BEING SUPPORTED AT BREAK-EVEN LEVEL BY ACTUAL GROUNDFISH CATCH	31.7	28.9	43.2	44.0	48.3	58.3	29.1	29.5	33.1

[1]For NAFO Division 3Ps data is only available for enterprises 35-64 feet in 1981 and 1982. The assessment for these two years in Division 3Ps is therefore an analysis of all groundfish enterprises greater than 35 feet.

In total, the nearshore enterprises 35-44 feet in NAFO Divisions 3K and 3L would require approximately 25% of the available 2J3KL groundfish allowance to break even in 1981, 29% in 1982 and only 21% in 1983. The nearshore fleet 35-44 feet in NAFO Division 3Ps, however, would require approximately 156% of the available groundfish quota in 1981, 114% in 1982 and 98% in 1983 in order to break even under Labour Cost Option "C".

4.3 Fleet Landings

Actual groundfish landings by the nearshore fleets, 35-44 feet, within each NAFO Division between 1981 and 1983 were below the level of groundfish landings required to support the fleet of active enterprises at the break-even level. Table 5 indicates, however, that the nearshore fleet in NAFO Division 3L came closer to landing the required amount of groundfish than enterprises in Divisions 3K or 3Ps. Over the three-year period, the 3L fleet landed an average of 49% of the average break-even groundfish requirements compared to 34% and 30%, respectively, for the fleets in Divisions 3K and 3Ps.

Table 5 also shows that there appears to be a direct relationship between reductions in fleet size and the percentage of each fleet capable of being supported at the break-even level by actual catches. This trend is not evident for inshore enterprises.

The actual catch of non-groundfish species was, in most instances, below the required catch. Unlike inshore enterprises, this indicates that the non-groundfish catch of the average sampled nearshore enterprise, 35-44 feet, was greater than the non-groundfish catch of the average enterprise in the fleet.

4.4 Proportion of the Fleet Achieving Average Break-Even Revenues

The use of break-even analysis in the previous subsections has determined that the average sampled nearshore enterprise, 35-44 feet, was unable to achieve the level of landings or revenues required to operate at the break-even level under Labour Cost Option "C", net cost basis. Extension of this analysis to the active fleet has also indicated that actual landings were well below the level required to support the population on an economic basis.

Analysis of fleet revenue data during the 1981-83 period (Table 6, p. 27) indicates that in most years a certain percentage of the nearshore fleet, within each NAFO Division, was operating, as a group, at the average break-even revenue level. It is interesting to note, however, that in 1981 no enterprise in NAFO Divisions 3K or 3Ps earned the required break-even revenue. Over the three-year period an average of 27% of the fleet in NAFO Division 3L achieved the break-even revenue level compared to 4% and 2% in NAFO Divisions 3K and 3Ps, respectively. These enterprises accounted for an average of approximately 53%, 11% and 6% of total fleet revenue in NAFO Divisions 3L, 3K and 3Ps,

TABLE 6

PERCENTAGE OF ACTIVE NEARSHORE POPULATION, 35-44 FEET, OPERATING, AS A GROUP, AT THE AVERAGE BREAK-EVEN REVENUE LEVEL, BY NAFO DIVISION, 1981-83

	DIVISION 3K			DIVISION 3L			DIVISION 3Ps[1]		
	1981	1982	1983	1981	1982	1983	1981	1982	1983
PERCENTAGE OF THE FLEET OPERATING, AS A GROUP, AT THE AVERAGE BREAK-EVEN REVENUE LEVEL	0	1.5	11.2	16.2	28.5	39.6	0	2.3	2.5
NUMBER OF ENTERPRISES OPERATING, AS A GROUP, AT THE AVERAGE BREAK-EVEN REVENUE LEVEL	0	2	14	31	49	57	0	3	3
PERCENTAGE OF FLEET REVENUE EARNED BY BREAK-EVEN SEGMENT OF FLEET	0	5.2	26.4	34.7	59.0	64.3	0	10.3	8.1

[1]For NAFO Division 3Ps data is only available for enterprises 35-64 feet in 1981 and 1982. The assessment for these two years in Division 3Ps is therefore an analysis of all groundfish enterprises greater than 35 feet.

respectively. The percentage of each fleet operating, as a group, at the break-even level increased continuously during the study period; suggesting that fleet reductions may have had a positive impact on vessel viability.

SECTION 5: NEARSHORE ENTERPRISES 45-64 FEET

5.1 Economic Performance - Average Sampled Enterprise

The actual performance of the average sampled nearshore enterprise 45-64 feet is compared (Table 7, p. 30) to the economic performance required to break even for the 1981-83 period. It is seen that the average sampled nearshore enterprise 45-64 feet in each NAFO Division failed to achieve the level of landings required to break even throughout the entire period. During the study period, enterprises in NAFO Division 3L required an average increase in actual groundfish landings of 45,971 kg. in order to break even while enterprises in Division 3K required an increase of 49,750 kg.. Data are available for enterprises in NAFO Division 3Ps for 1983 only, but it is seen that an increase in actual groundfish landings of 114,176 kg. is required for these enterprises to break even. This assessment, however, is based upon data for only three vessels and, due to possible sampling distortion, may not accurately reflect the average economic performance of the population of enterprises 45-64 feet in NAFO Division 3Ps.

Table 7 also compares actual revenues and required break-even revenues for the average sampled enterprise. Actual average revenues for enterprises in NAFO Division 3K increased from $31,653 to $73,050 during the three-year period while revenue required to break even increased from $62,891 to $84,416.

TABLE 7

ACTUAL PERFORMANCE AND THE REQUIRED BREAK-EVEN ECONOMIC PERFORMANCE FOR THE AVERAGE SAMPLED NEARSHORE ENTERPRISES, 45-64 FEET, BY NAFO DIVISION, 1981-83

	DIVISION 3K			DIVISION 3L			DIVISION 3Ps*
	1981	1982	1983	1981	1982	1983	1983
ACTUAL PERFORMANCE:							
Landings (kg):							
Groundfish	76,967	161,980	174,903	113,683	97,279	162,040	98,828
Pelagics & Estuarial	6,779	12,501	2,296	15,870	9	-	-
Molluscs & Crustaceans	639	6,474	-	2,396	50	-	2,091
Total	84,385	180,955	177,199	131,949	97,338	162,040	100,919
Revenue ($)	31,653	68,288	73,050	42,983	33,346	54,478	51,233
Return on Investment ($)	-	5,716	4,730	1,805	-	3,257	-
Average Income ($):							
Skipper	5,807	10,918	10,553	6,287	4,865	7,000	18,722
Deckhand	5,879	10,598	10,209	6,114	5,089	6,940	18,722
REQUIRED BREAK-EVEN ECONOMIC PERFORMANCE:							
Landings (kg):							
Groundfish	172,978	180,903	212,219	143,061	184,582	183,513	213,004
Pelagics & Estuarial	6,779	12,501	2,296	15,870	9	-	-
Molluscs & Crustaceans	639	6,474	-	2,396	50	-	2,091
Total	180,396	199,878	214,515	161,327	184,641	183,513	215,095
Revenue ($)	62,891	75,162	84,416	52,663	62,986	61,477	97,798
Return on Investment ($)	4,458	7,401	7,534	4,203	4,603	5,425	3,478
Average Income ($):							
Skipper	11,330	11,962	12,146	7,750	9,280	7,904	35,808
Deckhand	11,494	11,763	11,741	7,427	9,577	7,836	35,808
BREAK-EVEN GROUNDFISH LANDINGS AS A PERCENTAGE OF ACTUAL GROUNDFISH LANDINGS	224.7	111.7	121.3	125.8	189.7	113.3	215.5

*Data for NAFO Division 3Ps available for 1983 only.

In NAFO Division 3L, the increase in actual and required break-even revenue was less significant. From 1981-83 actual average revenue increased from $42,983 to $54,478 and required break-even revenue rose from $52,663 to $61,477. Time series data are not available for NAFO Division 3Ps.

Actual incomes received by fishermen as well as those that would be received if the average enterprise operated at the break-even level are also outlined in Table 7. It is seen that actual and break-even incomes are usually higher in NAFO Division 3K than in NAFO Division 3L. In neither NAFO Division, however, are average incomes equivalent to the average annual industrial aggregate wage for Newfoundland. In NAFO Division 3Ps, however, this is not the case. Actual wages averaged $18,722 per fisherman in 1983 and would have been $35,808 if the landings required to break even had been recorded. This is attributable to the large percentage of total revenues paid to the crew under the existing share arrangements and, like the other enterprise categories in NAFO Division 3Ps, questions the suitability of using Labour Cost Option "C" as an acceptable approach for determining resource requirements for this fishery. Data in Appendix 1 (Tables 16 and 17, pp. 51-52) illustrate that wages under Labour Option "C" at the break-even level for enterprises in NAFO Division 3L are less than half the average annual industrial aggregate wage and, for enterprises in NAFO Division 3K, are approximately 60% of the industrial wage.

5.2 Fleet Resource Requirements

Table 8 (p. 33) outlines the number of active nearshore groundfish enterprises 45-64 feet in each NAFO Division, and identifies the resource requirements for each population to break-even over the 1981-83 period.[1] The decline in the population noted for the previous enterprise categories is evident with enterprises 45-64 feet as well. Over the three-year period, the total number of active enterprises declined by an average of 35% from 224 enterprises in 1981 to 145 enterprises in 1983. The greatest decline occurred in NAFO Division 3L where 43% of the population in 1981 (82 enterprises) was absent from the groundfish fishery in 1983.

The analyses presented in Table 8 are based on the assumption that the break-even landings required by the average sampled enterprise in each NAFO Division can be applied to the population of enterprises. Over the three-year period, the population of enterprises in NAFO Division 3K required an average catch of 20,419 tonnes to break even compared to 11,346 tonnes for enterprises in NAFO Division 3L. (Time series data are unavailable for NAFO Division 3Ps.) In Divisions 3K and 3L the catch required for the populations to break even declined from 1981 to 1983 and no doubt reflects the decreases in each. Nonetheless, the populations have declined at a faster rate than

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[1]The process used to estimate the population of active fishing enterprises in the Newfoundland Region is explained in Appendix 2 (pp. 54-60).

TABLE 8

FLEET RESOURCE REQUIREMENTS AND LANDINGS FOR NEARSHORE ENTERPRISES, 45-64 FEET, BY NAFO DIVISION, 1981-83

	DIVISION 3K			DIVISION 3L			DIVISION 3Ps		
	1981	1982	1983	1981	1982	1983	1981	1982	1983
NUMBER OF ENTERPRISES:	119	110	83	82	66	47	23	12	15
RESOURCE REQUIREMENTS (t):									
Groundfish	20,584	19,899	17,614	11,731	12,182	8,625	N/A	N/A	3,195
Pelagics & Estuarial	807	1,375	191	1,301	1	-	N/A	N/A	-
Molluscs & Crustaceans	76	712	-	196	3	-	N/A	N/A	31
Total	21,467	21,986	17,805	13,228	12,186	8,625	N/A	N/A	3,226
PERCENTAGE OF AVAILABLE GROUNDFISH ALLOWANCE REQUIRED TO SUPPORT FLEET AT BREAK-EVEN LEVEL:	13.1	12.8	11.5	7.4	7.9	5.6	N/A	N/A	13.3
ACTUAL LANDINGS (t):									
Groundfish	11,093	12,931	9,488	10,065	7,514	6,791	N/A	N/A	1,769
Pelagics & Estuarial	342	464	234	1,487	1,144	931	N/A	N/A	-
Molluscs and Crustaceans	258	514	21	145	76	2	N/A	N/A	-
Total	11,693	13,909	9,743	11,697	8,734	7,724	N/A	N/A	1,769
NUMBER OF ENTERPRISES CAPABLE OF BEING SUPPORTED AT BREAK-EVEN LEVEL BY ACTUAL GROUNDFISH CATCH	64	71	45	70	41	37	N/A	N/A	8
PERCENTAGE OF FLEET CAPABLE OF BEING SUPPORTED AT BREAK-EVEN LEVEL BY ACTUAL GROUNDFISH CATCH	53.8	64.5	54.2	85.4	62.1	78.7	N/A	N/A	53.3

N/A = Not Available

the resources required to break even, e.g. the 3K fleet reduced by 30% from 1981-83 whereas required break-even landings fell by only 17%, and suggests that the relationship between fleet size and economic viability may be tenuous.

Since it is assumed that the growth in landings required for the population of enterprises to break even will come from groundfish species, it is not surprising that non-groundfish species account for very little of the total break-even catches. In NAFO Division 3K, non-groundfish species account for an average of approximately 5% of break-even landings compared to 4% and 1% for NAFO Divisions 3L and 3Ps, respectively.

The groundfish landings required for each population of enterprises to break even are expressed in Table 8 as a percentage of the available inshore (vessels less than 65 feet) groundfish allocation for each year. It is evident that suitable groundfish is available for all populations to achieve the break-even performance. The population of enterprises in NAFO Division 3Ps requires the greatest average percentage (13%) of available groundfish followed by NAFO Division 3K (12%) and 3L (7%). NAFO Divisions 3K and 3L, however, are allocated a single allowable catch based primarily on the 2J3KL cod stock complex. They, therefore, collectively required an average of 20% of the groundfish available during the 1981-83 period.

5.3 Fleet Landings

Table 8 outlines the actual catch of all nearshore enterprises 45-64 feet in each NAFO Division. Analysis of the

actual landings data reveals that the nearshore fleet in NAFO Division 3L came closer, on average, to achieving the level of landings required to break even. The data indicate that, during the 1981-83 period, actual landings averaged approximately 83% of required break-even landings. The comparable figures for NAFO Division 3K and 3Ps are 58% and 55%, respectively.

Table 8 also identifies the percentage of enterprises that can be supported at the break-even level by the actual groundfish landings. Analysis of the data suggests that the observed fleet reductions in NAFO Divisions 3K and 3L have not brought about an overall improvement in fleet viability. Despite significant reductions in these fleets, the percentage of the population of enterprises that can be supported at the break-even level by actual landings remained virtually unchanged during the 1981-83 period in 3K and decreased in 3L. (Time series data are unavailable for Division 3Ps.)

5.4 Proportion of the Fleet Achieving Average Break-Even Revenues

In the previous subsections the economic performance of the average enterprise 45-64 feet was analyzed. It was shown that the average enterprise in each NAFO Division failed to break even and that, by extension, the populations of enterprises also failed to break even. In each population, however, a certain percentage (Table 9, p. 37) of the enterprises, as a group, was successful in achieving the average break-even revenue level.

The data in Table 9 are consistent with those outlined in Tables 7 and 8. Enterprises in NAFO Division 3L faired best, followed by enterprises in NAFO Divisions 3K and 3Ps. Over the 1981-83 period, the viable segment of the population, as identified, represented approximately 65% of the enterprises in NAFO Division 3L compared to only 31% of the enterprises in NAFO Division 3K. Data for Division 3Ps for 1983 show that the viable fleet segment was only 6.7% of the enterprises. The data also show that even though the numbers of enterprises participating in the fishery declined from 1981 to 1983, fleet viability has not improved. In both Divisions 3K and 3L, the number and the percentage of enterprises operating at the average break-even level was lower in 1983 than in 1981. (Time series data are unavailable for enterprises in Division 3Ps.)

Table 9 also illustrates that the viable fleet sector earned a disproportionate share of total revenues. The break-even fleet segment in NAFO Division 3K in 1983, for instance, accounted for 23% of the active enterprises but earned approximately 55% of total fleet revenue. Similar trends are apparent for NAFO Divisions 3L and 3Ps.

TABLE 9

PERCENTAGE OF ACTIVE NEARSHORE POPULATION 45-64 FEET OPERATING, AS A GROUP, AT THE AVERAGE BREAK-EVEN REVENUE LEVEL, BY NAFO DIVISION, 1981-83

	DIVISION 3K			DIVISION 3L			DIVISION 3Ps
	1981	1982	1983	1981	1982	1983	1983
PERCENTAGE OF FLEET OPERATING, AS A GROUP, AT THE AVERAGE BREAK-EVEN REVENUE LEVEL:	28.6	35.5	27.7	76.8	50.0	63.8	6.7
NUMBER OF ENTERPRISES OPERATING, AS A GROUP, AT THE AVERAGE BREAK-EVEN REVENUE LEVEL	34	39	23	63	33	30	1
PERCENTAGE OF FLEET REVENUE EARNED BY BREAK-EVEN SEGMENT OF FLEET	50.4	56.8	54.8	92.2	74.5	74.4	14.9

SECTION 6: CONCLUSION

This report has evaluated the economic performance of inshore and nearshore groundfish enterprises in NAFO Divisions 3K, 3L and 3Ps during the 1981-83 period using a break-even methodology. The break-even requirements for the average enterprise in each fleet were determined and applied to the respective populations to identify fleet break-even resource requirements. These resource levels were then compared to the groundfish allowances for the inshore and nearshore fisheries in each NAFO Division to determine whether sufficient resource was available for each fleet to operate at the break-even level. Finally, an assessment of the actual catches and revenues recorded by each fleet over the three-year period was undertaken. The numbers of the enterprises that could potentially be supported at the break-even level by actual catches, as well as, the numbers of enterprises that, as a group, actually achieved the break-even revenue levels were determined.

The major conclusions of this report are:

(1) The average enterprise in each fleet failed to achieve sufficient revenues and landings to break even on annual operations during the three year study period;

(2) Enterprises in NAFO Division 3L had a better overall economic performance than enterprises in NAFO Divisions 3K or 3Ps. For each fleet and year under analysis, the average enterprise in NAFO Division 3L generally came the closest to operating at the break-even level. In addition, during each year under study, the actual annual landings of each fleet in NAFO Division 3L generally composed a higher percentage of the required break-even fleet resource requirements compared to other NAFO Divisions. Further to the point, for each fleet, the group of enterprises that collectively achieved the break-even revenue consistently comprised a higher percentage of the population of enterprises in NAFO Division 3L than in the others for each year under study;

(3) Enterprises in NAFO Division 3Ps generally recorded the poorest economic performance. This was a general observation for each fleet for each year of the study period and pertains to the break-even performance of the average enterprise and the percentage that actual annual landings comprised of break-even fleet resource requirements. In addition, the percentage of each fleet that collectively achieved the break-even revenue was generally lower in Division 3Ps compared to Divisions 3K and 3L for each year under analysis;

(4) There is insufficient resource for all the fleets, as a group, to break even. The three fleet sectors in each of NAFO Divisions 3K and 3L, for instance, collectively

required approximately 108%, 120% and 102% of the available 2J3KL groundfish allowances to break even in 1981, 1982 and 1983, respectively. In NAFO Division 3Ps, the situation is worse as the fleets under analysis would have required a total of approximately 335%, 298% and 294%, of the available groundfish allowances to break even in 1981, 1982 and 1983, respectively. In that the fleets examined do not include other inshore and nearshore groundfish users, (i.e. purse seine enterprises, enterprises less than 20 feet, enterprises skippered by part-time fishermen and all fleet sectors in NAFO Subarea 2). It is therefore clear that the total inshore and nearshore break-even groundfish resource requirements exceed the available groundfish allowances;

(5) Utilizing Labour Cost Option "C" in determining enterprise break-even resource requirements results in excessive incomes accruing in NAFO Division 3Ps relative to the other NAFO Divisions. As a consequence, fleet break-even resource requirements are also excessive under Labour Cost Option "C" in comparison to NAFO Divisions 3K and 3L. These relatively high incomes and resource requirements are a function of the higher percentage of revenues allocated to labour in Division 3Ps;

(6) The population of each fleet has decreased over the three-year period. Given the poor overall economic performance over the study period, this is consistent with what we would expect to occur and suggests that harvesting capacity is adjusting to economic conditions. Nonetheless, the observed fleet reductions have not been accompanied by a general overall improvement in either enterprise or fleet break-even economic performance.

In undertaking this study and arriving at the above conclusions, it became apparent that the current knowledge respecting the inshore and nearshore groundfish enterprises requires additional work. There is a need for an improved data base as well as for additional research and analysis. To address these issues, it is recommended that:

(1) Further research be undertaken to determine the causes of the extreme variations that exist in the distribution of enterprises by landings and landed values. It is recalled that a small percentage of enterprises account for a disproprotionate share of actual catches and revenues and that the remaining enterprises account for only a limited volume of resource. The reasons for lower than average catches by this latter group of enterprises should be documented; and, wherever possible, corrective measures ought to be identified and implemented;

(2) A more detailed analysis of the reductions that have been observed in the fleets of active enterprises should be conducted. The reasons for these reductions need to be more fully understood and an assessment of what has happened to the enterprises that are no longer active in the fishery is required. It needs to be known for the optimum management of the fishery, for instance, if these enterprises are sitting idle and will re-enter the fishery if conditions improve, if fleet reductions have occurred through attrition, etc.. In particular, the role - if any - that fisheries management policy has played in the fleet reductions needs to be clarified. The Task Force on Atlantic Fisheries identified employment maximization and ongoing economic viability as two major objectives of Atlantic fisheries policy. The analyses conducted in this assessment indicate that the economic viability of the inshore and nearshore groundfish enterprises under study has not improved since 1981 while, through fleet reductions, employment has been diminished. If existing fisheries policy in any way, shape or form is responsible for this state of affairs then there is an urgent need for fisheries managers to reconsider the tools currently in use for the management of the inshore and nearshore fisheries in the Newfoundland Region;

(3) Individual vessel data on all vessels less than 35 feet should be maintained by the Department of Fisheries and

Oceans. Currently, the Statistics and Systems Branch maintains these data only for vessels over 35 feet and this seriously retards the accuracy, efficiency and statistical validity with which analytical assessments of the inshore fishery can be undertaken. Given the importance of the inshore fishery to the economic and social fabric of the Province of Newfoundland and Labrador, we accord this recommendation a high priority.

In closing, it must be noted that the inshore and nearshore groundfish fisheries in the Newfoundland Region are perhaps the most studied but least understood components of Atlantic Canada's fishing industry. This report has sought to clarify the understanding of these components by presenting time series analyses of the economic performance of inshore and nearshore groundfish enterprises. The completion of the studies and provision of the data recommended in this report would contribute even further to the current knowledge respecting these enterprises, and thus assist fisheries managers in deriving the optimum benefits from the fishery.

APPENDIX 1

ACTUAL PERFORMANCE AND THE REQUIRED BREAK-EVEN ECONOMIC PERFORMANCE FOR THE AVERAGE SAMPLED ENTERPRISE BY LABOUR COST OPTION, NAFO DIVISION AND ENTERPRISE SECTOR, 1981-83

TABLE 10

ACTUAL PERFORMANCE AND THE REQUIRED BREAK-EVEN ECONOMIC PERFORMANCE FOR THE AVERAGE SAMPLED INSHORE ENTERPRISE, 20-34 FEET, IN NAFO DIVISION 3K BY LABOUR COST OPTION, 1981-83

		LABOUR COST OPTION "A"		LABOUR COST OPTION "B"		LABOUR COST OPTION "C"	
	ACTUAL	NET	FULL	NET	FULL	NET	FULL
1981:							
Groundfish Landings (kg)	16,537	45,572	45,862	125,939	126,229	39,193	40,528
Total Landings (kg)	19,983	49,018	49,308	129,385	129,675	42,639	43,974
Total Revenue ($)	9,030	19,381	19,486	48,474	48,579	17,072	17,055
Average Income ($):							
Skipper	2,987	7,164	7,164	20,467	20,467	5,628	5,787
Deckhand	2,906	5,970	5,970	17,056	17,056	5,477	5,632
1982:							
Groundfish Landings (kg)	30,894	63,028	63,982	166,887	167,841	61,446	65,911
Total Landings (kg)	34,277	66,411	67,365	170,270	171,224	64,829	69,294
Total Revenue ($)	13,382	23,811	24,123	57,773	58,085	23,294	24,754
Average Income ($):							
Skipper	3,966	8,123	8,123	22,589	22,589	6,929	7,363
Deckhand	4,211	6,769	6,769	18,824	18,824	7,347	7,805
1983:							
Groundfish Landings (kg)	22,613	50,679	51,391	130,624	131,337	56,347	60,358
Total Landings (kg)	26,194	54,260	54,972	134,205	134,918	59,928	63,939
Total Revenue ($)	11,635	22,411	22,716	53,300	53,575	24,629	26,177
Average Income ($):							
Skipper	4,115	8,364	8,364	22,651	22,651	8,709	9,256
Deckhand	3,953	6,970	6,970	18,876	18,874	8,376	8,903

TABLE 11

ACTUAL PERFORMANCE AND THE REQUIRED BREAK-EVEN ECONOMIC PERFORMANCE FOR THE AVERAGE SAMPLED INSHORE ENTERPRISE, 20-34 FEET, IN NAFO DIVISION 3L, BY LABOUR COST OPTION, 1981-83

		LABOUR COST OPTION "A"		LABOUR COST OPTION "B"		LABOUR COST OPTION "C"	
	ACTUAL	NET	FULL	NET	FULL	NET	FULL
1981:							
Groundfish Landings (kg)	25,760	51,749	52,598	127,754	128,603	50,743	54,718
Total Landings (kg)	34,405	60,394	61,243	136,399	137,248	59,388	63,363
Total Revenue ($)	12,120	21,353	21,657	48,653	48,867	20,993	22,416
Average Income ($):							
Skipper	3,945	7,833	7,833	20,467	20,467	6,858	7,323
Deckhand	4,103	6,527	6,527	17,056	17,056	7,097	7,578
1982:							
Groundfish Landings (kg)	35,614	50,617	51,493	149,451	150,329	49,718	53,671
Total Landings (kg)	42,766	57,769	58,645	156,603	157,481	56,870	60,823
Total Revenue ($)	14,927	19,985	20,280	53,292	53,588	19,682	21,014
Average Income ($):							
Skipper	4,391	7,211	7,211	22,589	22,589	5,809	6,202
Deckhand	5,299	6,009	6,009	18,824	18,824	6,993	7,466
1983:							
Groundfish Landings (kg)	35,899	67,641	68,391	159,032	159,782	60,147	64,138
Total Landings (kg)	38,768	70,510	71,260	161,901	162,651	63,016	67,007
Total Revenue ($)	13,999	24,714	24,969	55,787	56,042	22,166	23,523
Average Income ($):							
Skipper	4,422	9,017	9,017	22,651	22,651	7,000	7,428
Deckhand	4,561	7,514	7,514	18,876	18,876	7,246	7,689

TABLE 12
ACTUAL PERFORMANCE AND THE REQUIRED BREAK-EVEN ECONOMIC PERFORMANCE FOR THE AVERAGE SAMPLED INSHORE ENTERPRISE, 20-34 FEET, IN NAFO DIVISION 3PS, BY LABOUR COST OPTION, 1981-83

		LABOUR COST OPTION "A"		LABOUR COST OPTION "B"		LABOUR COST OPTION "C"	
	ACTUAL	NET	FULL	NET	FULL	NET	FULL
1981:							
Groundfish Landings (kg)	26,784	48,674	49,698	106,243	107,155	61,131	66,471
Total Landings (kg)	30,178	52,068	53,092	109,637	110,549	64,525	69,865
Total Revenue ($)	12,802	20,986	21,369	42,517	42,858	25,645	27,642
Average Income ($):							
Skipper	4,817	8,935	8,935	20,467	20,467	9,677	12,908
Deckhand	5,981	7,446	7,446	17,056	17,056	11,976	10,431
1982:							
Groundfish Landings (kg)	17,602	46,213	46,596	120,439	120,859	73,531	76,871
Total Landings (kg)	18,207	46,818	47,201	121,044	121,462	74,136	77,476
Total Revenue ($)	8,812	19,418	19,560	46,956	47,111	29,553	30,792
Average Income ($):							
Skipper	3,696	8,210	8,210	22,589	22,589	12,395	13,297
Deckhand	3,810	6,842	6,842	18,824	18,824	12,762	12,915
1983:							
Groundfish Landings (kg)	18,747	49,992	50,339	102,858	103,205	87,824	91,039
Total Landings (kg)	19,418	50,663	51,010	103,529	103,876	88,495	91,710
Total Revenue ($)	10,477	22,371	22,503	42,513	42,645	36,785	38,010
Average Income ($):							
Skipper	5,614	10,803	10,803	22,651	22,651	19,687	20,342
Deckhand	4,778	9,002	9,002	18,876	18,876	16,758	17,315

TABLE 13

ACTUAL PERFORMANCE AND THE REQUIRED BREAK-EVEN ECONOMIC PERFORMANCE FOR THE AVERAGE SAMPLED NEARSHORE ENTERPRISE, 35-44 FEET, IN NAFO DIVISION 3K BY LABOUR COST OPTION, 1981-83

		LABOUR COST OPTION "A"		LABOUR COST OPTION "B"		LABOUR COST OPTION "C"	
	ACTUAL	NET	FULL	NET	FULL	NET	FULL
1981:							
Groundfish Landings (kg)	51,124	71,332	75,893	186,315	190,869	130,386	153,181
Total Landings (kg)	61,868	82,076	86,637	197,059	201,613	141,130	163,925
Total Revenue ($)	18,441	24,483	25,842	58,748	60,105	42,081	48,874
Average Income ($):							
Skipper	4,087	6,534	6,534	20,467	20,467	9,227	10,717
Deckhand	6,576	5,445	5,445	17,056	17,056	14,819	17,211
1982:							
Groundfish Landings (kg)	54,908	93,740	98,380	249,139	253,776	189,684	216,831
Total Landings (kg)	65,895	104,727	109,367	260,126	264,763	200,671	227,818
Total Revenue ($)	24,291	38,309	39,984	94,408	96,082	72,945	82,745
Average Income ($):							
Skipper	4,826	7,124	7,124	22,589	22,589	14,470	16,414
Deckhand	4,901	5,937	5,937	18,824	18,824	14,668	16,639
1983:							
Groundfish Landings (kg)	61,409	104,193	107,205	226,865	229,879	130,729	144,162
Total Landings (kg)	66,703	109,487	112,499	232,159	235,173	136,023	149,456
Total Revenue ($)	24,762	39,698	40,771	83,406	84,480	49,153	53,939
Average Income ($):							
Skipper	5,907	8,973	8,973	22,651	22,651	11,728	12,870
Deckhand	5,095	7,478	7,478	18,767	18,767	10,015	10,990

TABLE 14

ACTUAL PERFORMANCE AND THE REQUIRED BREAK-EVEN ECONOMIC PERFORMANCE FOR THE AVERAGE SAMPLED NEARSHORE ENTERPRISE, 35-44 FEET, IN NAFO DIVISION 3L BY LABOUR COST OPTION, 1981-83

		LABOUR COST OPTION "A"		LABOUR COST OPTION "B"		LABOUR COST OPTION "C"	
	ACTUAL	NET	FULL	NET	FULL	NET	FULL
1981:							
Groundfish Landings (kg)	32,723	79,107	84,159	187,165	192,220	114,719	138,135
Total Landings (kg)	87,260	133,644	138,696	241,702	246,757	169,256	192,672
Total Revenue ($)	18,575	33,729	35,381	69,064	70,717	45,374	53,031
Average Income ($):							
Skipper	4,536	8,266	8,266	20,467	20,467	11,077	12,947
Deckhand	4,478	6,888	6,888	17,056	17,056	10,864	12,698
1982:							
Groundfish Landings (kg)	38,588	78,274	85,852	226,816	234,578	120,524	152,172
Total Landings (kg)	70,340	110,026	117,604	258,568	266,330	152,276	183,924
Total Revenue ($)	19,071	32,243	34,759	81,559	84,136	46,270	56,777
Average Income ($):							
Skipper	4,608	6,777	6,777	22,589	22,589	11,952	14,666
Deckhand	3,916	5,647	5,647	18,824	18,824	10,073	12,361
1983:							
Groundfish Landings (kg)	73,155	100,910	103,604	241,011	243,855	114,199	124,663
Total Landings (kg)	104,217	131,972	134,666	272,073	274,917	145,261	155,725
Total Revenue ($)	30,008	39,338	40,302	86,924	87,889	43,897	47,447
Average Income ($):							
Skipper	6,025	8,274	8,274	22,651	22,651	8,841	9,555
Deckhand	5,650	6,897	6,897	18,876	18,876	8,231	8,896

TABLE 15

ACTUAL PERFORMANCE AND THE REQUIRED BREAK-EVEN ECONOMIC PERFORMANCE FOR THE AVERAGE SAMPLED NEARSHORE ENTERPRISE, 35-44 FEET, IN NAFO DIVISION 3PS BY LABOUR COST OPTION, 1981-83

		LABOUR COST OPTION "A"		LABOUR COST OPTION "B"		LABOUR COST OPTION "C"	
	ACTUAL	NET	FULL	NET	FULL	NET	FULL
1981:							
Groundfish Landings (kg)	54,022	92,067	95,072	143,869	146,874	241,239	268,365
Total Landings (kg)	59,565	97,610	100,615	149,412	152,417	246,782	273,908
Total Revenue ($)	25,345	39,527	40,648	58,849	59,970	95,168	105,286
Average Income ($):							
Skipper	8,454	12,280	12,280	20,467	20,467	31,723	35,095
Deckhand	8,891	10,234	10,234	17,056	17,056	33,287	36,825
1982:							
Groundfish Landings (kg)	71,657	86,024	88,277	164,571	166,825	208,359	225,890
Total Landings (kg)	79,147	93,514	95,767	172,061	174,315	215,849	233,380
Total Revenue ($)	31,408	36,877	37,738	66,882	67,743	83,609	90,306
Average Income ($):							
Skipper	10,713	10,512	10,512	22,589	22,589	28,503	30,786
Deckhand	9,414	8,760	8,760	18,824	18,824	25,125	27,137
1983:							
Groundfish Landings (kg)	80,165	113,722	114,792	168,708	169,728	200,631	210,036
Total Landings (kg)	81,087	114,644	115,714	169,630	170,650	201,553	210,958
Total Revenue ($)	34,411	46,004	46,397	67,176	67,569	79,479	83,104
Average Income ($):							
Skipper	11,715	14,462	14,462	22,651	22,651	26,993	28,224
Deckhand	10,205	12,052	12,052	18,876	18,876	23,619	24,696

TABLE 16

ACTUAL PERFORMANCE AND THE REQUIRED BREAK-EVEN ECONOMIC PERFORMANCE FOR THE AVERAGE SAMPLED NEARSHORE ENTERPRISE, 45-64 FEET, IN NAFO DIVISION 3K BY LABOUR COST OPTION, 1981-83

		LABOUR COST OPTION "A"		LABOUR COST OPTION "B"		LABOUR COST OPTION "C"	
	ACTUAL	NET	FULL	NET	FULL	NET	FULL
1981:							
Groundfish Landings (kg)	76,967	109,083	117,855	254,938	263,708	172,978	186,891
Total Landings (kg)	84,385	116,501	125,273	262,356	271,126	180,396	194,309
Total Revenue ($)	31,653	42,125	44,976	89,528	92,378	62,891	73,418
Average Income ($):							
Skipper	5,807	7,085	7,085	20,467	20,467	11,330	18,377
Deckhand	5,879	5,906	5,906	17,056	17,056	11,494	19,471
1982:							
Groundfish Landings (kg)	161,980	142,300	164,214	280,669	302,586	180,903	254,544
Total Landings (kg)	180,955	161,275	183,189	299,644	321,561	199,878	273,519
Total Revenue ($)	68,228	61,265	69,154	111,078	118,968	75,162	101,673
Average Income ($):							
Skipper	10,918	9,904	9,904	22,589	22,589	11,962	16,181
Deckhand	10,598	8,254	8,254	18,824	18,824	11,763	15,912
1983:							
Groundfish Landings (kg)	174,903	169,594	181,269	311,965	323,642	212,219	249,960
Total Landings (kg)	177,199	171,890	183,565	314,261	325,938	214,515	252,256
Total Revenue ($)	73,050	67,515	72,144	123,965	128,595	84,416	99,380
Average Income ($):							
Skipper	10,553	9,583	9,583	22,651	22,651	12,146	14,229
Deckhand	10,209	7,986	7,986	18,876	18,876	11,741	13,823

TABLE 17

ACTUAL PERFORMANCE AND THE REQUIRED BREAK-EVEN ECONOMIC PERFORMANCE FOR THE AVERAGE SAMPLED NEARSHORE ENTERPRISE, 45-64 FEET, IN NAFO DIVISION 3L BY LABOUR COST OPTION, 1981-83

		LABOUR COST OPTION "A"		LABOUR COST OPTION "B"		LABOUR COST OPTION "C"	
	ACTUAL	NET	FULL	NET	FULL	NET	FULL
1981:							
Groundfish Landings (kg)	113,683	168,489	171,669	298,334	301,517	143,061	153,951
Total Landings (kg)	131,949	186,755	189,935	316,600	319,783	161,327	172,217
Total Revenue ($)	42,983	61,029	62,075	103,758	104,795	52,663	56,246
Average Income ($):							
Skipper	6,287	10,588	10,588	20,467	20,467	7,750	8,282
Deckhand	6,114	8,823	8,823	17,056	17,056	7,427	7,937
1982:							
Groundfish Landings (kg)	97,279	160,712	163,974	334,279	337,535	184,582	197,800
Total Landings (kg)	97,338	160,771	164,033	334,338	337,594	184,641	197,859
Total Revenue ($)	33,346	54,870	55,979	113,883	114,990	62,986	67,480
Average Income ($):							
Skipper	4,865	9,036	9,036	22,589	22,589	9,280	9,865
Deckhand	5,089	7,530	7,530	18,824	18,824	9,577	10,260
1983:							
Groundfish Landings (kg)	162,040	174,558	183,036	376,155	384,630	183,513	210,095
Total Landings (kg)	162,040	174,558	183,036	376,155	384,630	183,513	210,095
Total Revenue ($)	54,478	58,477	61,317	126,012	128,851	61,477	70,382
Average Income ($):							
Skipper	7,000	8,274	8,274	22,651	22,651	7,904	9,049
Deckhand	6,940	6,897	6,897	18,876	18,876	7,836	8,971

TABLE 18

ACTUAL PERFORMANCE AND THE REQUIRED BREAK-EVEN ECONOMIC PERFORMANCE FOR THE AVERAGE SAMPLED NEARSHORE ENTERPRISE, 45-64 FEET, IN NAFO DIVISION 3PS BY LABOUR COST OPTION 1983

		LABOUR COST OPTION "A"		LABOUR COST OPTION "B"		LABOUR COST OPTION "C"	
	ACTUAL	NET	FULL	NET	FULL	NET	FULL
1983:							
Groundfish Landings (kg)	98,828	85,851	87,903	125,375	127,695	213,004	231,275
Total Landings (kg)	100,919	87,942	89,994	127,466	129,786	215,095	233,366
Total Revenue ($)	51,233	45,835	46,782	62,063	63,009	97,798	105,249
Average Income ($):							
Skipper	18,722	15,246	15,246	22,651	22,651	35,808	38,536
Deckhand	18,722	12,705	12,705	18,876	18,876	35,808	38,536

APPENDIX 2

ESTIMATION OF INSHORE AND NEARSHORE ENTERPRISE POPULATIONS, 1981-83

The method used to determine the population of inshore groundfish enterprises 20-34 feet LOA, and nearshore groundfish enterprises 35-64 feet in NAFO Divisions 3K, 3L and 3Ps for the period 1981-83 is outlined in this appendix. Data used to calculate these populations were obtained from the Statistics and Systems Branch and from the Fishing Enterprise Survey System (FESS), Economics Branch of the Department of Fisheries and Oceans. The process used is relatively straightforward and requires little elaboration.

Inshore Enterprises

Data was obtained from the Statistics and Systems Branch respecting the total number of registered inshore vessels owned by individuals licenced as full-time fishermen in NAFO Divisions 3K, 3L and 3Ps for the period 1981-83. Only those full-time owners whose largest vessel was in the 20-34 feet length category were included. All registered vessels owned by these individuals, however, were counted in the total, including vessels less than 20 feet. The total number of inshore vessels owned was determined for each year, and then divided by the average number of registered inshore vessels per inshore enterprise for that year provided by the FESS.

This process provided an estimate of the total number of inshore enterprises 20-34 feet length overall for the period 1981-83. However, not all these enterprises were active each year. A certain percentage of vessel owners in any given year do not

participate in the industry due to illness, the availability of employment elsewhere, etc.. Information respecting participation rates was also obtained from the FESS and applied to the total number of full-time inshore enterprises. As a result it was estimated that there were 2,488 active full-time inshore enterprises 20-34 feet in 1981, 2,309 in 1982 and 1,989 in 1983.

To check the reliability of these figures, estimates were made of the number of active part-time inshore enterprises and the number of active full-time enterprises less than 20 feet using the same procedure as identified above. This provided an estimate of the total population of active inshore enterprises (part-time and full-time) for 1981-83. The average landings and landed values for each subset (i.e. full-time enterprises less than 20 feet, full-time enterprises 20-34 feet, and part-time enterprises less than 35 feet) recorded in the FESS was then multiplied by the relevant estimated number of enterprises.

The results were then totalled and compared against the actual inshore landings and landed values recorded by the Statistics and Systems Branch for each year. These data are provided in Table 19 (p. 57). It can be seen that the estimated landings and landed values compare favourably to the actual data and therefore suggests that the procedure used to estimate inshore enterprises is reliable.

TABLE 19

TOTAL LANDINGS AND LANDED VALUES OF THE ESTIMATED INSHORE ENTERPRISES COMPARED TO ACTUAL LANDINGS AND LANDED VALUES, 1981-83

ENTERPRISE CATEGORY	ACTIVE ENTERPRISES	AVERAGE LANDINGS	AVERAGE REVENUE	TOTAL LANDINGS	TOTAL REVENUE
	(#)	(kg)	($)	(kg)	($)
1981					
Full-time <20'	1,527	11,991	5,544	18,310,257	8,465,688
Full-time 20-34'	2,488	28,855	11,137	71,791,240	27,708,856
Part-time <35'	2,360	4,858	2,949	11,465,096	6,959,702
TOTAL (Estimated)	NA	NA	NA	101,566,593	43,134,246
TOTAL (Actual)	NA	NA	NA	101,262,000	40,276,676
1982					
Full-time <20'	1,529	11,062	7,322	16,913,798	11,195,338
Full-time 20-34'	2,309	35,034	13,132	80,893,506	30,321,738
Part-time <35'	1,858	6,218	4,030	11,553,155	7,487,614
TOTAL (Estimated)	NA	NA	NA	109,360,459	49,004,740
TOTAL (Actual)	NA	NA	NA	108,705,000	47,581,877
1983					
Full-time <20'	1,562	11,775	8,565	18,394,112	13,520,672
Full-time 20-34'	1,939	30,054	12,372	59,777,406	24,607,908
Part-time <35'[1]	NA	NA	NA	10,683,380	6,846,380
TOTAL (Estimated)	NA	NA	NA	88,854,893	44,974,960
TOTAL (Actual)	NA	NA	NA	97,342,000	41,473,098

NA - Not Applicable

[1]An estimate based on the assumption that part-time enterprises accounted for the average percentage of total actual landings and landed value and recorded by part-time enterprises in 1981 and 1982.

The distribution of the active full-time enterprises 20-34 feet by NAFO Division was determined by the percentage of total vessels owned by inshore vessel owners in each NAFO Division. These percentages and the distribution of enterprises are illustrated in Table 20.

TABLE 20

DISTRIBUTION OF ACTIVE INSHORE ENTERPRISES 20-34 FEET BY NAFO DIVISION, 1981-83

NAFO DIVISION	1981		1982		1983	
	%	No.	%	No.	%	No.
3K	34.8	866	35.0	808	35.9	714
3L	38.9	968	39.7	917	39.3	782
3Ps	26.3	654	25.3	584	24.8	493
TOTAL	100.0	2,488	100.0	2,309	100.0	1,989

NEARSHORE ENTERPRISES

Estimation of the number of active nearshore groundfish enterprises for the period 1981-83 was completed with both part-time and full-time enterprises included in the population. This is considered a suitable approach because the level of investment required for a nearshore enterprise is such that part-timers can realistically be expected to fish at a level comparable to full-timers. Also, the part-time enterprises form only a small

percentage of the population (approximately 7%) and thus would not significantly affect any analyses even if there were major differences between the resource requirements, etc., of part-time and full-time enterprises.

The process used to estimate the population of active nearshore groundfish enterprises was simpler than that used for estimating inshore enterprises. Since the Statistics and Systems Branch maintains individual data for all nearshore vessels, it was relatively straightforward to obtain the actual numbers of nearshore vessels by length category that recorded landings using only groundfish gears. For the purposes of this study, only those vessels having landed values in excess of $3,000 were considered to be commercially active in the fishery. Vessels with landed values less than $3,000 were not included in the estimates. Since a nearshore enterprise is almost uniformly composed of a single active nearshore vessel, the number of active vessels serves as a reasonably accurate estimate of the population of nearshore enterprises.

Table 21 (p. 60) is derived from the data provided by the Statistics and Systems Branch and illustrates the distribution of the population of nearshore groundfish enterprises 35-44 feet and 45-64 feet with landed values in excess of $3,000 by NAFO Division for 1981, 1982, and 1983.

TABLE 21

NUMBER OF NEARSHORE GROUNDFISH ENTERPRISES WITH LANDED VALUES GREATER THAN $3,000 BY LENGTH CATEGORY AND NAFO DIVISION, 1981 - 83

NAFO DIVISION	LENGTH CATEOGRY	YEAR		
		1981	1982	1983
3K	35'-44'	139	135	125
	45'-64'	119	110	83
3L	35'-44'	191	172	144
	45'-64'	84	66	47
3Ps	35'-44'	125	120	118
	45'-64'	23	12	15
TOTAL		679	615	532

PUBLICATIONS LISTING

PUBLICATIONS LISTING OF THE ECONOMICS BRANCH FISHERIES AND OCEANS P.O. BOX 5667 ST. JOHN'S, NFLD.

1983

1. A Review of the Newfoundland Bait Service: Action Alteratives for the 80's, W.M. Follett, February, 1983. (INTERNAL-CONFIDENTIAL)

2. Costs and Earnings of Selected Inshore and Nearshore Fishing Enterprises in the Newfoundland Region, 1981, Economics Branch, May, 1983.

3. Cost Recovery and Proposed Action Plan for Newfoundland Bait Service, W.M. Follett, July, 1983. (INTERNAL-CONFIDENTIAL)

4. Costs and Earnings of Shrimp Fishing Enterprises in the Esquiman Channel, Gulf of St. Lawrence, 1981, Economics Branch, August, 1983.

5. An Economic Assessment of the Esquiman Channel Shrimp Fishery, Gulf of St. Lawrence, 1981, P.R. Hood, August, 1983.

6. Costs and Earnings of Selected Inshore Fishing Enterprises by Vessel Type and NAFO Division, Newfoundland Region, 1981, Economics Branch, August, 1983.

7. Costs and Earnings of Selected Nearshore Fishing Enterprises by Vessel Type and NAFO Division, Newfoundland Region, 1981, Economics Branch, August, 1983.

8. Regional Profiles of the Area North of 50° Latitude in Newfoundland and Labrador, K. Voutier, October, 1983 (INTERNAL-CONFIDENTIAL)

1984

9. An Assessment of the Economic Viability of the Northern Shrimp Fishery, 1983, K. Voutier, January, 1984.

10. Costs and Earnings of Selected Inshore and Nearshore Fishing Enterprises in the Newfoundland Region - 1982, Economics Branch, March, 1984.

11. Economic Indicators of Inshore and Nearshore Fishing Enterprises 1979-1982, Economics Branch, March, 1984.

12. The Processing Sector North of 50° Latitude: A Financial Profile, J.E. Davis and W.M. Follett, July, 1984 (INTERNAL-CONFIDENTIAL)

PUBLICATIONS LISTING

13. An Economic Assessment of the Middle Distance Longline Pilot Project Using the Norwegian Longliner MV KELTIC, M.C. Grandy, July, 1984

14. Costs and Earnings of Selected Inshore and Nearshore Fishing Enterprises in the Newfoundland Region - 1983, Economics Branch, September, 1984.

15. The Socio-Economic Importance of the Commercial Salmon Fishery in Newfoundland and Labrador, A Report Prepared for the 1984 Atlantic Salmon Task Group by Economics Branch, Department of Fisheries & Oceans, Nfld. Region, October, 1984.

16. Benefit/Cost Analysis - Direct Sales Program - Newfoundland Region, 1984, Brian Donahue, November, 1984

17. An Economic Assessment of the 1982 St. Pierre Bank Scallop Fishery, M.C. Grandy, December, 1984.

18. An Economic Assessment of the Purse Seine Fishery in the Newfoundland Region, M.C. Grandy, December, 1984.

19. Economic Indicators of Inshore and Nearshore Fishing Enterprises in the Newfoundland Region 1979-1983, Economics Branch, December, 1984

1985

20. An Economic Assessment of Inshore and Nearshore Groundfish Enterprises in NAFO Divisions 3K, 3L and 3Ps - 1981-83, Kenneth A. Carew and Keltie S. Voutier, September, 1985.